Researches on Crustacea No. 6 (1974)
Carcinological Society of Japan
c/o Odawara Carcinological Museum
Azabu-Juban 3-11, Minatoku, Tokyo

FOUR SPECIES OF THE NEPALESE PRAWNS

(With two Plates and four Figures in Text)

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ネパール産4種のテナガエビ

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Introduction

The Ladoratory of Ichthyology in the Crown Prince's Palace of Japan was kind enough to send the author 16 specimens of the Nepalese Palaemonid prawns for his study, in April, 1972. According to the information from the Laboratory they were found from among many of the Nepalese fishes preserved in formalin solution, which had been presented in 1970 by Dr. R. B. THAPA, the director of the Fisheries Bureau of Nepal to our Crown Prince H. I. H. AKIHITO for his studies. According to the labels attached to the said specimens those fishes were collected together with the prawns by the Breeding and Distribution Centre, Biratnagar and Lake Development Project, Pokhara, in May to July, 1969.

So far as the author knows the fauna of the shrimps or prawns of Nepal has not hitherto been reported, therefore the said specimens, though small in number, are very valuable and their examination is of great interest to us. The author's examinations of 16 specimens showed that they reprensented 4 species of the genus *Macrobrachium* of the Palaemonidae: *M. australe, M. palaemonoides, M. sintangense and M. nepalense* sp. nov. The author intends to describe them in detail here in after.

Acknowledgements

The author wishes to express his sincere thanks to our Crown Prince who has granted him very valuable and interesting-specimens to study, and he is also grateful

to Mr. K. MEGURO, a staff of the Board of the Crown Prince's Affairs, for the trouble he kindly took to send the grant possible. Acknowledgement is also due to the former Professor Dr. S. MIYAKE who has kindly offered facilities for important literatures.

Description

1. *Macrobrachium australe* (GUÉRIN-MÉNEVILLE)

(Pl. I Fig. 1 ; Text-fig. 1)

Palaemon australis GUERIN-MÉNEVILLE, 1838, p. 37. (not read)
Palaemon dispar VON MARTENS, 1868, p. 41. (not read)
Palaemon (Eupalaemon) dispar : DE MAN, 1892, p. 427, Tab. 26 figs. 34, 34 a-e.
Leander lepidus DE MAN, 1915, p. 410, Tab. 28 fig 6. (not read)
Macrobrachium australe : HOLTHUIS, 1950, p. 120, Figs. 27–30.

Specimens examined : 1 female, in which the right second pereiopod is missing, collected by the Breeding and Distribution Centre ; 3 females in which all the second pereiopods are missing. The lengths of the specimens are measured in mm as in Table 1.

Table 1. Measurement in mm of body, carapace and telson. *M. australe.*

Specimen	Body length without rostrum	Carapace length without rostrum	Telson length
♀ A	36	11.5	6.5
♀ B	37	11	6.5
♀ C	36	11	6.5
♀ D	33	10	6.5

Localities and Date : Breeding and Distribution Centre, Parvanipur. May 30, 1969. 3 females (B, C, D). Fisheries Station, Parvanipur. May 30, 1969. 1 female (A).

Carapace and Rostrum : The carapace is smooth. The hepatic spine is smaller than the antennal spine and it is placed distinctly behind and slightly below the latter. The rostrum is long, slightly beyond the end of the scaphocerite, and more or less curves upwards gradually towards the apex. The upper margin is provided with 7 teeth, excluding 2 accessory teeth of the tip, the first 2 of which are placed on the carapace behind the posterior margin of the orbits. Anterior half of the teeth are gradually widely separated, the distance between the ultimate (anterior) and penultimate teeth is much larger than that between the other teeth ; the lower margin is

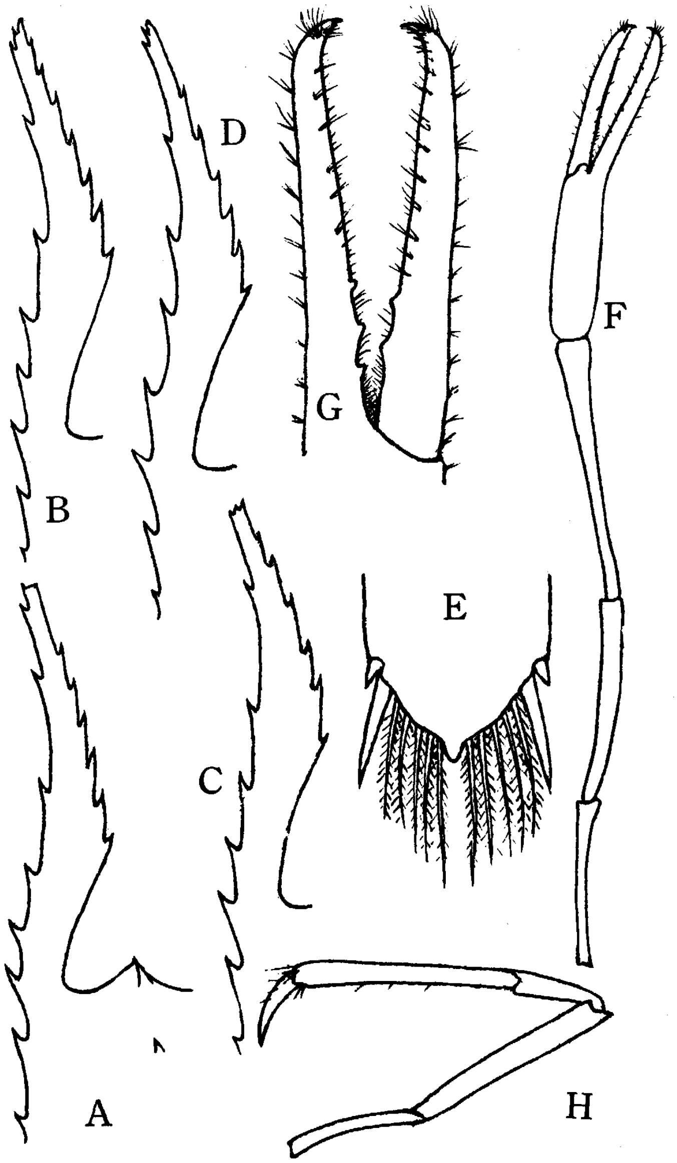

Fig. 1. *Macrobrachium australe* (GUÉRIN-MÉNEVILLE).
A : anterior part of female carapace (× 5). B,C,D : female rostrum (× 5). E : tip of telson (markedly enlarged). F : female second leg (× 5). H : female third leg (× 5). A, E, F and H figured from same female.

provided with 6 or 7 teeth. The first tooth of both margins is smaller than the second.

Telson : The posterior part becomes gradually narrow posteriorly, the posterior margin ends in a distinct median point, which is flanked 2 pairs of spines and 10 feathered setae. The two inner spines distinctly overreach the apex of the telson and expand towards the outside.

Pereiopods: The lengths of somites of the second to fourth pereiopods of a female (A) with a length of 36 mm are measured in mm as in Table 2. The first pereiopods fail to reach the end of the scaphocerite.

Table 2. Measurement in mm of somites of the 2nd to 4th legs. *M. australe.*

	Ischium	Merus	Carpus	Propodus	Dactylus	Total length
2nd leg	4	5	6.5	4	4	23.5
3rd leg	3	5	2	5	2	17
4th leg	3	5.5	2.5	5	2	18

The ratios in length of each somite of the second pereiopod against the mobile finger are as follow: palm 1.33, carpus 2.16, merus 1.66, ischium 1.33. The fixed finger presents three teeth on proximal about one third of the cutting edge, the mobile finger presents two teeth placed between the three opposite teeth of the fixed finger. The dactylus of the third to fifth pereiopods are simple and curved backwards.

Distribution: This species has very wide distribution: Madagascar and its adjacent islands, Reunion I., Mauritius I., Seychelles I., India and the above mentioned locality, Sumatra, Flores, Timor, Celebes, New Guinea, Tahiti I., Marques Is.

2. ***Macrobrachium palaemonoides*** **HOLTHUIS**

(Pl. II Fig. 1; Text-fig. 2)

HOLTHUIS, 1950, p. 136, Fig. 31 a-g.

Specimens examined: 3 ovigerous females collected by the Breeding and Distribution Centre. The lengths of the specimens measured in mm as in Table 3.

Table 3. Measurement in mm of body, carapace and telson. *M. palaemonoides.*

Specimen	Body length without rostrun	Carapace length without rostrum	Telson length
♀ A	42.5	12	7.5
♀ B	36	11	6.5
♀ C	34	9.5	6

Localities and Date: Karra River. June 25, 1969. 1 male (A). Fisheries Station, Parvanipur. May 30, 1969. 2 females (B, C).

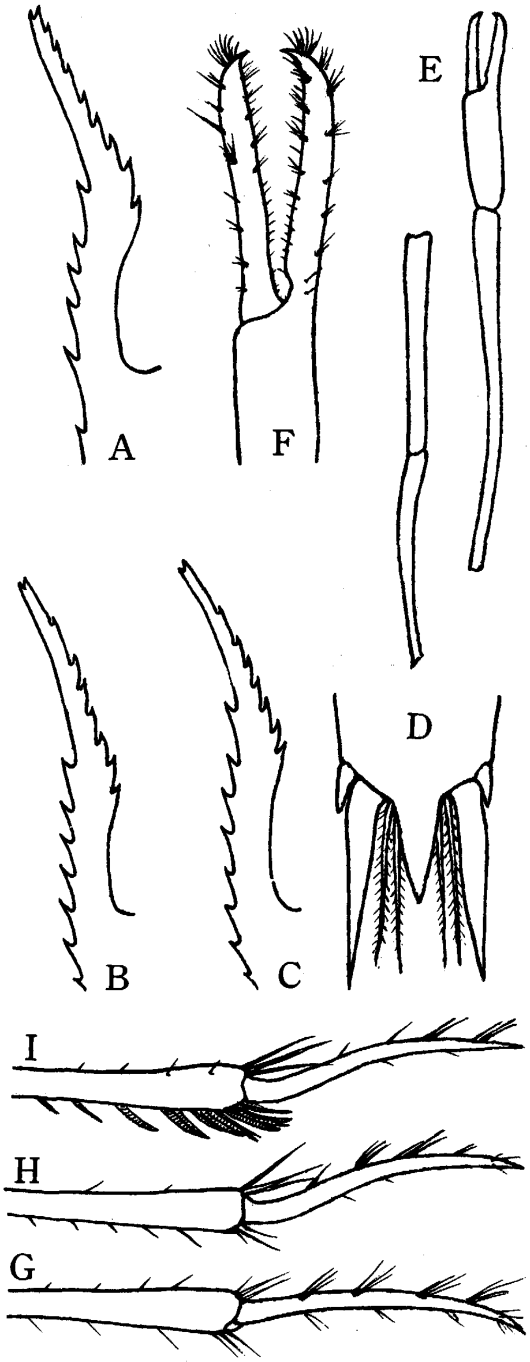

Fig. 2. *Macrobrachium palaemonoides* HOLTHUIS. A—C: ovigerous female rostrum (×5). D: tip of telson (markedly enlarged). E: distal three and proximal two somites of female second leg (×5). F: chela of same leg (×16). G—I: dactylus of third to fifth leg (×16). A and D—I figured from same female.

Carapace and Rostrum: The carapace is smooth, the hepatic spine is about as strong as the antennal spine and placed much behind and below it. The rostrum is elongate, and extends beyond the scaphocerite, the distal about half is curved upwards. The upper margin of the rostrum bears 6 to 8 teeth excluding an accessory tooth of the tip, 1 or 2 of the proximal teeth are placed on the carapace behind the posterior margin of the orbits. The teeth are regularly divided at about half of the rostrum over the proximal, the distance between the ultimate and penultimate teeth is slightly larger than that between the other teeth. The lower margin of the rostrum bears 7 teeth, which are regularly divided over the distal part, but the distance between the ultimate and penultimate teeth is slightly larger than that between the others.

Telson: The posterior part of the telson ends in a long and sharp median point, which is flanked on either side with 2 spines. The two inner spines are very long, expand very slightly towards the outsides, and overreach farther than the median point; the outer spines are very short. Between the two inner spines 4 feathered setae are present.

Pereiopods: All the pereiopods are very long and slender. The lengths of somites of the second to the fifth legs are measured in mm as in Table 4. The first legs reach with part of fingers only beyond the scaphocerite. The second legs reach beyond the scaphocerite by the chela and up to 1/3 of the carpus. The third legs reach beyond the scaphocerite by the tip of the dactylus. The fourth legs are longer than the third. The last legs are conspicuously longer than the third, and reach beyond the scaphocerite by distal part of the propodus. The dactylus of the 3rd to the 5th legs more or less curve backwards excepting the basal part which is slightly bent in the opposite direction. (Fig. 2 G—I.)

Table 4. Measurement in mm of somites of the 2nd to the 5th legs. *M. palaemonoides*.

Pereiopod	Ischium	Merus	Carpus	Propodus	Dactylus	Total length
2nd leg	5. 5	5. 5	9	3	2	25
3rd leg	3	6	2. 5	5	2	18. 5
4th leg	2. 5	7	3	6	2	20. 5
5th leg	3	7	4	8	2	24

The fingers of the second leg are shorter than the palm, measuring 2/3 of the latter, the carpus is 1.8 times as long as the chela and 1.6 times as long as the merus. The cutting edges of the fingers are entire.

Eggs: The berries borne by 42.5mm long prawn kept in formalin solution are light-greenish yellow and counted 146 grains. The eggs are almost globular in shape, and comparatively large in size, namely, 1.2 mm long and 1 mm wide.

Distribution: This species was discovered for the first time by Dr. EDWARD JACOBSON from the Laulo Lake (fresh-water), N. Simalur, off the Westcoast of Sumatra in 1913. Most probably Parvanipur, Nepal will be recognized as the second distributional locality of the species.

3. *Macrobrachium sintangense* (DE MAN)

(Pl. I Fig. 2; Text-fig. 3)

Palaemon (Eupalaemon) elegans DE MAN, 1892, p. 440, Taf. 26 Figs. 36, 36 a-d.
Palaemon (Eupalaemon) sintangensis DE MAN, 1898 a, p. 138, Pl. 6 Fig. 1 a-k.
Palaemon nipponensis: LANCHESTER, 1901, p. 566.
Macrobrachium elegans: SUVATTI, 1937, p. 49. (not read)
Macrobrachium sintangense: HOLTHUIS, 1950, p. 151.
———— JOHNSON, 1966, p. 431.

Specimens examined: 2 females collected by the Breeding and Distribution Centre; 1 juvenile male and 2 females collected by the Lake Development Project. The pair or one of the second pereiopods are missing in all the females. The lengths of the specimens are measured in mm as in Table 5.

Table 5. Measurement in mm of body, carapace and telson. *M. sintangense*.

specimen	Body length		Carapace length		Telson length
	with rostrum	without rostrum	with rostrum	without rostrum	
A, ♀	*	*	26	15	8.5
B, ♀	*	*	17.5	11.5	5.5
C, ♀	45	37	19.5	10.5	6.5
D, ♀	*	*	14	9	5.5
E, ♂	*	*	16.5	10	5.5

* not measured exactly for the body is fixed in a bending posture which is familiar to the shrimps or prawns.

Localities and Date: Tarahara Farm (Birat.) of the Breeding and Distribution

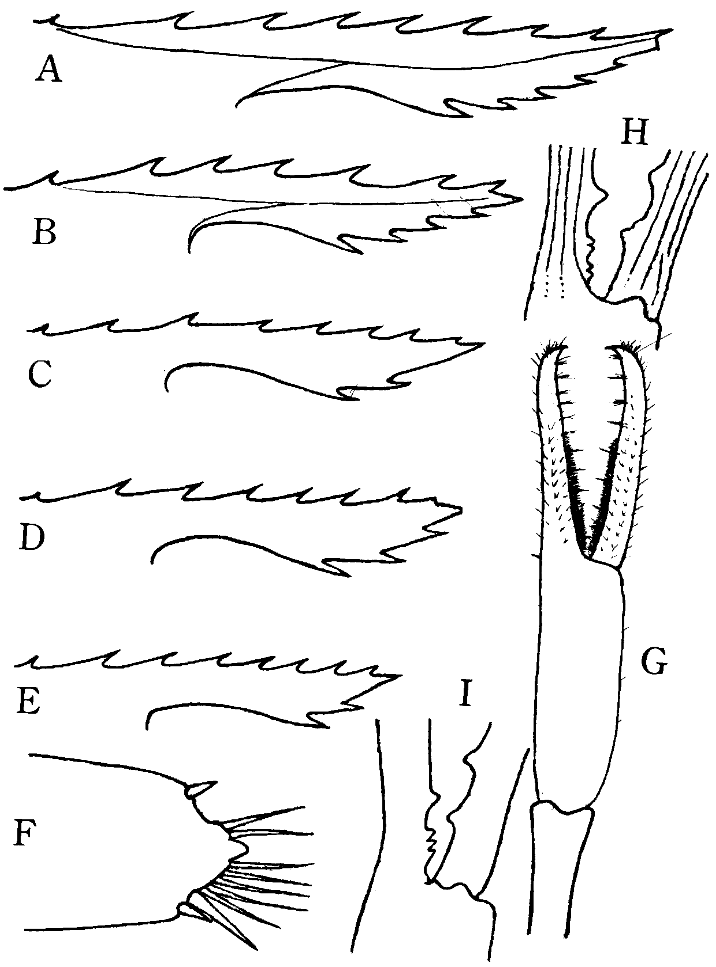

Fig. 3. *Macrobrachium sintangense* (de Man). A, B : female rostrum (×5). C : male rostrum (×5). D, E : female rostrum (×5). F : tip of telson (markedly enlarged). G : female second chela (×5), H : proximal part of fingers of same, cutted off hairs. I : proximal part of fingers of male chela, cutted off hairs (markedly enlarged). A, F and G figured from same female.

Centre, Biratnagar. Jun 15, 1969. 2 females (A, C). Phewa Tal, Pokhara. July 15, 1969. 1 male and 2 females (B, D).

Carapace and Rostrum : The carapace is smooth. The hepatic spine is smaller than the antennal spine and placed behind and below it. The rostrum nearly straight, extends beyond the antennular peduncle, but fails to reach the scaphocerite. The formulae of the rostrum teeth of 5 specimens are $2+\frac{7}{5}$ (f. A), $2+\frac{5}{4}$ (f. C), $2+\frac{6}{3}$ (f. B), $2+\frac{6}{2}$ (f. D and m), namely, the rostrum is furnished on the upper margin with 7 to 9 teeth and on the lower margin with 2 to 5 teeth, 2 of the former are placed on the carapace behind the posterior margin of the orbits.

Telson: The posterior part becomes gradually narrow posteriorly, the posterior margin ends in a median point, which is flanked 2 pairs of spines and 10 feathered setae. The two inner spines overeach the apex of the telson and markedly expand towards the outsides; the outer spines are very short.

Pereiopods: The length of each somite of the second pereiopods is measured as in mm as in Table 6. The carpus of the females are distinctly longer than the palm and 1.6 or 1.7 times as long as finger. That of the male is about equal to the palm or finger. In a male specimen with a total length of 45.5 mm from Kuala Lumpur, Malaysia which has been examined by the present author the carpus is 1.6 times as long as the plam and 2 times as long as the finger. The mobile finger and the fixed finger of the chela are furnished with brown velvety covering of hairs on the proximal cutting edges respectively.

Table 6. Measurement in mm of somites of 2 nd legs. *M. sintangense.*

Specimen	Ischium	Merus	Carpus	Palm	Finger	Total length
♀A: R.	7	7	8.5	6	5	29
♀B: R.	5	5	6.5	5	4	25.5
♂ : R.	5	5.5	5.5	5	4	24
L.	5	5	5	5	5	24

R. Stards for right leg, and L. for left leg.

Moreover the mobile finger presents two conical teeth there; the fixed finger is also armed with two or three teeth, in the former the first tooth appears minute triple and the second is conical (Fig. 3, I), in the latter the inner two teeth appear minute duple which are contiguous to each other and the other tooth is conical (Fig. 3, H), The teeth of the mobile finger are placed to bite each other with the opposite teeth of the fixed finger, and all the teeth of both fingers are lost in the velvety covering of the proximal cutting edges. It is remarkable that the fingers of the largest female (A) with a carapace length of 15 mm present some longitudinal grooves from which the hairs grow (Fig. 3, H). When the mobile finger is placed on the fixed one to joint them closely, both meet each other with the hook shaped tips, holding rather broad space extending from the base to the apex between them.

Distribution: The present species is recorded only in the freshwaters of Borneo (Sintang, basin of Kapuas River), Java, Sumatra, Malaysia, Thailand and the above mentioned localities. Among these distributional localities Lampan of Thailand is situated up the Menam River, Biratnagar and Pokhara of Nepal, up the Ganges River;

both are at a large distance from the sea and at a high altitude.

Note: The present species closely resembles *Macrobrachium nipponense* which is abundant in Japan, North and South China along the coastal provinces, and used for a delicious food, but from the latter it differs in the velvety covering of the proximal cutting edges of the second chela.

4. *Macrobrachium nepalense* sp. nov.

(Pl. II Fig. 2; Text-fig. 4)

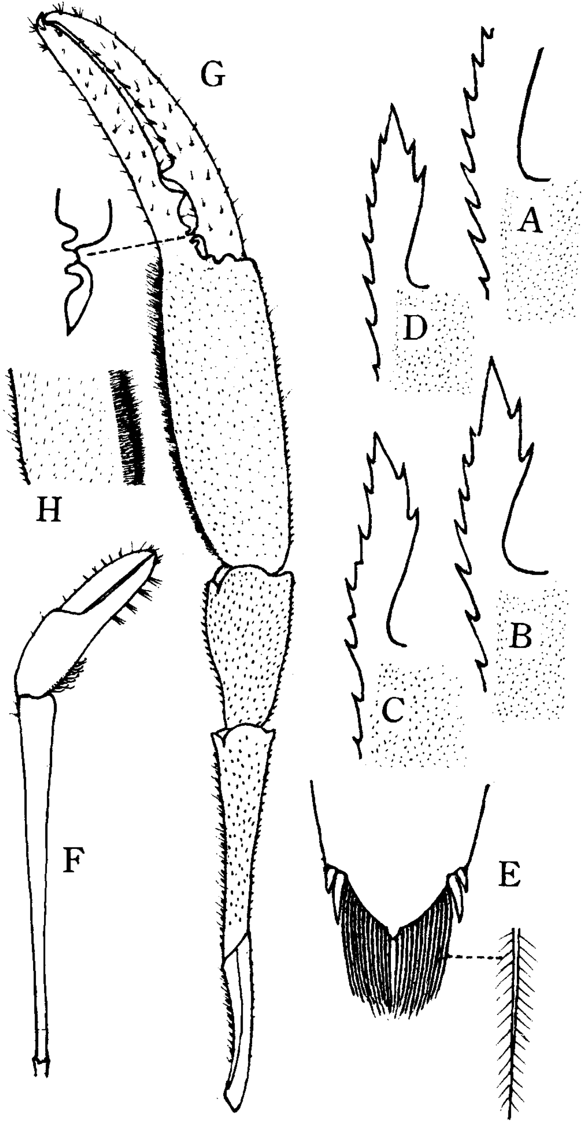

Fig. 4. *Macrobrachium nepalense* sp. nov. A—D: male rostrum (×3). E: tip of telson (markedly enlarged). F: male first leg (×6.5). G: male second leg (×3). H: inner view of a part of palm (×3). A and F—H figured from same male specimen.

Specimens examined: 4 males collected by the Tarahara Farm (Birat.) of the Breeding and Distribution Centre; the largest one in which the terminal half of the rostrum is broken off and the second pair of pereiopods are detached. The lengths of these specimens are measured in mm as in Table 7.

Table 7. Measurement in mm of body, carapace and telson. *M. nepalense* sp. nov.

Specimen	Body length		Carapace length		Telson length
	with rostrum	without rostrum	with rostrum	without rostrum	
♂ A	?	51	?	17	8
♂ B	51.5	43	21.5	14	6.5
♂ C	48	41	22	14	6.5
♂ D	43	36.5	18	12	6

Locality and Date: Tarahara Farm (Birat.) of the Breeding and Distribution Centre. June 15, 1969. 4 males.

Carapace and Rostrum: The carapace is covered with numerous minute spines, making the whole surface asperated. The hepatic spine is very smaller than the strong antennal spine and placed behind and below it. The restrum reaches the end of the antennular peduncle, somewhat convex over the eyes, with 7 or 9 teeth on the upper margin and 2 on the lower margin, 2 or 3 of the former on the carapace behind the posterior margin of the orbits, namely, the formulae of the rostrum teeth are as follow: $3+\frac{2}{4}$ (B), $3+\frac{6}{2}$ (C), $2+\frac{5}{2}$ (D).

Telson: Its posterior margin is roundish and ends in a small median point, which is flanked by two pairs of the spines and many feathered setae. The inner pair of the spines failes to overreach the apex of the telson.

Pereiopods: In the first pereiopods the carpus is elongate, expanded gradually towards the distal portion and as long as merus; the fingers are a little longer than the palm. The second pereiopods are stout, plumped and slightly unequal in the large male specimens (A, B). All the somites excepted fingers are provided with numerous small or minute spines, which are largest in the lower edges of the ischium to the carpus. The fingers are furnished with hairs which are arranged into several longitudinal rows. Each somite from the ischium to the finger is measured in mm as in Table 8. The carpus is distinctly shorter than the merus in length, and more or less triangular in longitudinal section. The palm is more or less oblong, somewhat compressed, with the inner-lower edge covered, though apt to be unnoticed, with very soft hairs. The fingers are white in formalin solution, and almost equal to the palm in length. The mobile finger armed with two conical teeth on proximal about one-third

Table 8. Measurement in mm of somites of the 2nd legs. *M. nepalense* sp. nov.

Specimen		Ischium	Merus	Carpus	Palm	Finger	Total length
♂A:	R.	7	8	6	12	12	45
	L.	7	8	7	10	11	43
♂B:	R.	5	7	5.5	8	9	34.5
	L.	5	6.5	5	7.5	8	32
♂C:	R.	6	5.5	5	7	7	30.5
	L.	6	5.5	5	7	7	30.5
♂D:	R.	5	5	4	5	5	24
	L.	5	5	4	5.5	5	24.5

R. stands for right leg, and L. for left leg.

of the cutting edge; the fixed finger is also armed with a conical tooth on the proximal part and minute duple or triple tooth on the extreme proximal part of the cutting edge.

Each somite from the ischium to the dactylus of the third to the fifth leg of the two large males is measured in mm as in Table 9. The ultimate is a little longer than the penultimate one. The latter has about the same length as the third leg.

Table 9. Measurement in mm of somites of the 2nd legs. *M. nepalense* sp. nov.

Pereiopod		Ischium	Merus	Carpus	Propodus	Dactylus	Total length
♂A:	3rd	*	*	*	*	*	
	4th	4	8	4	7	3.5	26.5
	5th	4	8	4.5	8	3.5	28
♂B:	3rd	4	6.5	3.5	5	2.5	21.5
	4th	4	6.5	3.5	5.5	2.5	22
	5th	4	6.5	4	6.5	2.5	23

* not measured for the 3rd legs are missing.

Remarks: Judging from "the key to indo-westpacific species of the genus *Macrobrachium*" by HOLTHUIS, 1950, the specimens dealt with here resemble *Macrobrachium hendersoni* (DE MAN) which has been found till now only in the eastern Himalayas, but differ by some characters of the second chela. Compared with the Yunnan specimens of *M. hendersoni,* which was described as *Palaemon yunnanensis* in 1936 by YU from Yunnan Province, S. China, it appears that the chief specific differences may be arranged under the 6 heads, thus:———

Yunnan specimens of *Macrobrachium hendersoni.* (carapace length including rostrum: 20–23 mm)	Nepal specimens of *Macrobrachium nepalense* sp. nov. (carapace length excluding rostrum: 12–17 mm)
1. The rostrum is very convex and short, reaching only to the middle of the second segment of the antennular peduncle.	1. The rostrum is not so convex and short, reaching to the end of the antennular peduncle.
2. The first one or two of the upper border teeth of the rostrum are placed on the carapace.	2. The first two or three of the upper border teeth of the rostrum are placed on the carapace.
3. The palm of the second leg is much compressed, much longer than the fingers.	3. The palm of the second leg is somewhat compressed, almost as long as the fingers.
4. The inner-lower edge of the palm is uncovered with hairs.	4. The inner-lower edge of the palm is covered with very soft hairs.
5. The fingers of the large chela bear several longitudinal hairy grooves.	5. The fingers of the large chela bear several longitudinal rows of hairs.
6. Both the fingers of the chela present two conical teeth on the proximal cutting edge, respectively.	6. The mobile finger presents two conical teeth, and the fixed finger also two teeth, the first of which is minute triple, the second conical.

要　約

1970年，ネパールの水産局長タッパ博士から，日本の皇太子殿下のご研究用として，同国産の多くの魚類標本（ホルマリン漬）が殿下に献上された。それは，1969年5月から7月にわたって，東ネパールのビラトナガールにある養魚兼配苗センターと，中部ネパールのポカーラにある湖水開発企業などの手によって，広く採集されたもののようである。東宮御所の魚類研究室で，それらの魚類標本を整理されたところ，16体のエビが混じっていた。皇太子殿下の思し召しにより，そのエビを私の研究用に賜わることになり，東宮職から1972年4月郵送到着した。私は寡聞にして，ネパールのエビについて報告されたものを知らないので，多大の興味関心をもってつぶさに観察した結果，それらの内4体は *Macrobrachium australe*，3体は *M. palaemonoides*，5体は *M. sintangense* であり，4体は新種と認め *M. nepalense* と命名した。

この新種は，従来ヒマラヤ山脈の水域（ダージリングその他）からのみ知られていた *M. hendersoni* に以ているが，主として第2胸脚の「はさみ」の特徴によってそれと異なる。すなわち，新種にあっては，掌節の内側下辺がやわらかな毛で密におおわれ，可動と不動

両指の表面に縦溝が１つも見あたらないのである。

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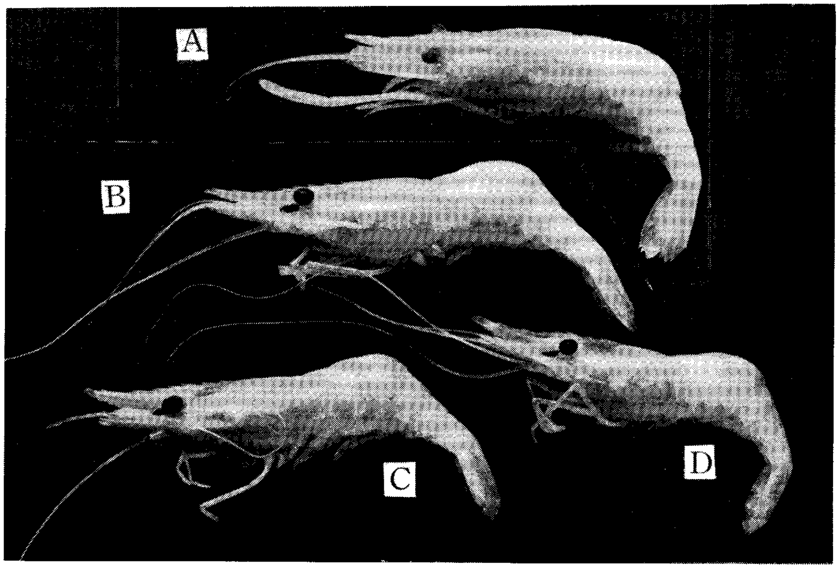
Plate I.



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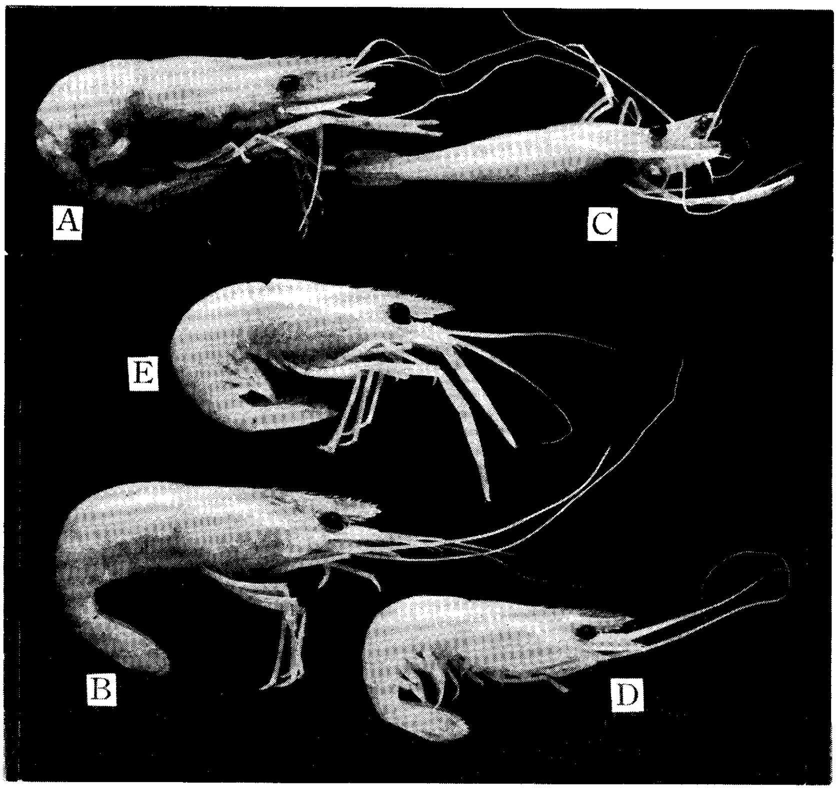


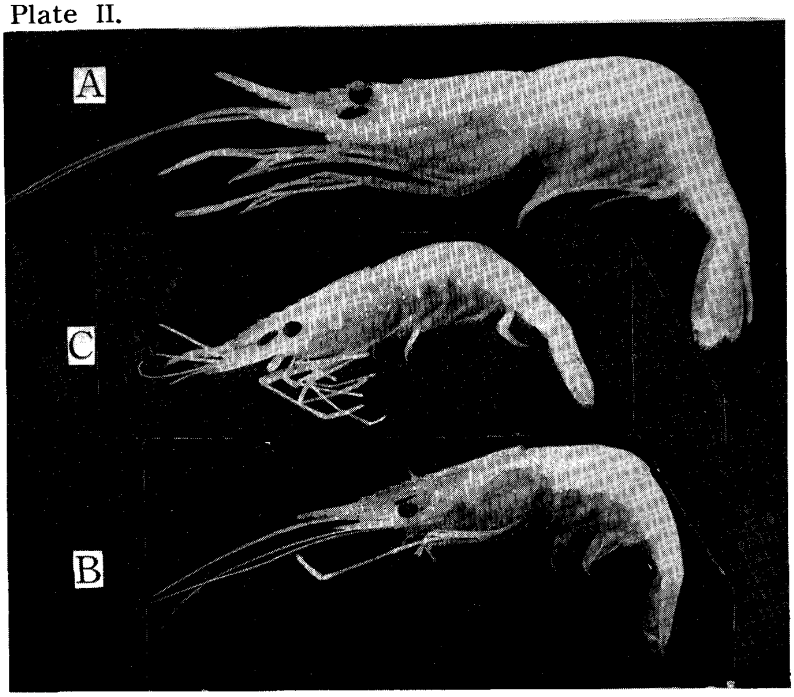
2

Explanation of Pl. I

Fig. 1. *Macrobrachium australe* (Guérin-Méneville).
A—D: female (×1.3).

Fig. 2. *Macrobrachium sintangense* (de Man).
A, C: female (×1.0). B, D: female (×1.5). E: male (×1.5).

Plate II.



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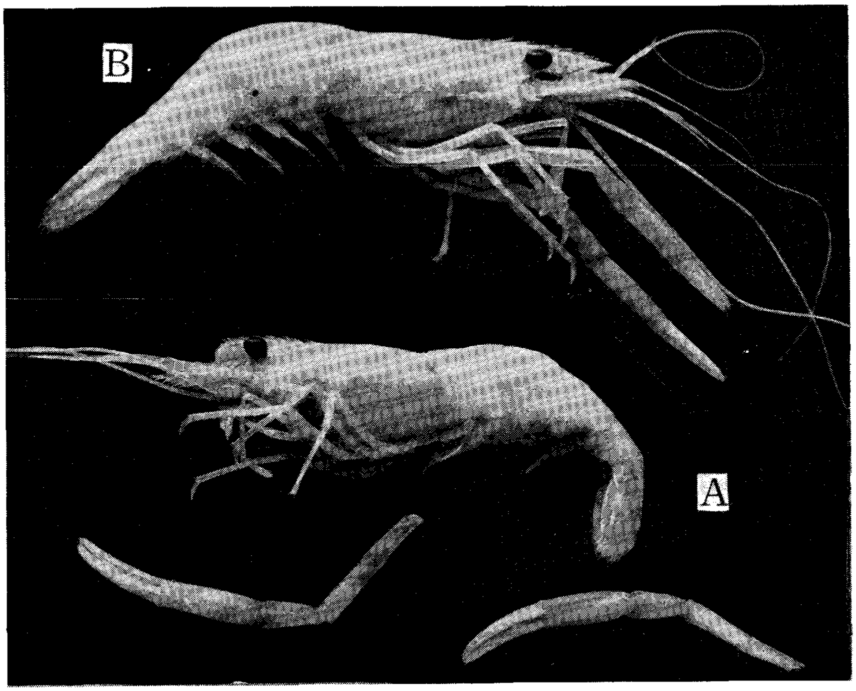

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Explanation of Pl. II

Fig. 1. *Macrobrachium palaemonoides* HOLTHUIS.

A: ovigerous female (×1.6). B: ovig. female (×1.3). C: ovig. female (×1.5).

Fig. 2. *Macrobrachium nepalense* sp. nov.

A: male (×1.3). B: male (×1.5).